7/29/04 Meeting Notes – Landfill Stability Workgroup
Bluff Conference Room – South Central Region Headquarters

Attending: Sherren Clark (BT^2), Gene Mitchell (DNR), John Reindl (Dane County), Brad Wolbert (DNR).

I. Problem Statement: DNR sent out the following draft problem statement on landfill stability a few weeks ago:

> ***Current landfill designs and practices do not produce stable land areas within a defined and reasonable timeframe. Economic burdens and environmental risks associated with these unstable landfills are largely borne by future generations. Many of these burdens and risks stem from the presence of undegraded organic wastes. Better landfill designs and practices must be identified and implemented to produce stable landfills within a reasonable timeframe.***
>
> ***"Stable" means maintenance and active management are no longer needed to protect human health and the environment.***
>
> ***"Reasonable timeframe" means within the lifetime of the people who generate the waste. (On average, this implies 30 years.)***
>
> ***"Economic burdens" means costs to manage gas and leachate, to maintain the slopes and cover, and to control access; the loss of the material resources housed in the landfill; and the foregone productive uses and aesthetic values of the land that are unavailable to society by virtue of its condition as an unstable closed landfill.***
>
> ***"Environmental risks" includes potential contamination of groundwater and surface water, air quality degradation, greenhouse gas impacts, explosive gas generation, and land instability.***

Consensus of group:

- ok for now as a working draft
- may not be worded best for public understanding
- the meaning of "stable" as defined here may not be intuitive to others outside our group

II. Evaluation Criteria for Stability Technologies/Strategies

We will evaluate each stability approach in terms of these measures. Group discussed each criterion suggested in previous meeting, and added one more:

Sustainability: Suggestion that we start with the Bruntland Commission definition of sustainable development: "development that meets the needs of the present without compromising the ability of the future to meet its own needs." Another way of stating it is "will this have to be dealt with or paid for by future generations?" With respect to waste issues, we felt sustainability implies that resources are returned to use and that the practice can be continued indefinitely.

Health and Safety: We added this criterion to the list. Stated differently: "does the technology present a hazard?"

Timeframe: For our purposes, this means the relative reduction in time it takes for the landfill to reach stability. (The time it takes to implement is considered an aspect of implementability.)

Implementability: This includes several aspects:

- time to implement
- regulatory/legal barriers
- tried and proved?
- reliability
- technical complexity
- degree of change needed by industry

Economics: Includes:

- long-term net costs
- short-term capital requirements
- who spends money vs who gets reward
- changes in competitive dynamics
- scale issue – localized benefits within national or multinational company

Impacts on Gas, Water Quality, Land: Primary, direct impacts, i.e., does this alternative address the immediate problem (represented by the dry-tomb landfill)? For example, if an alternative avoided the acid phase of landfill evolution, it would score high in this measure.

Secondary Impacts: These are typically indirect, occur away from the landfill. They likely have an economic component. Need to identify these, judge magnitude, determine if they are controllable, and compare to primary impacts. Recognize that these are not always negative.

Adherence to DNR's EMS Principles: There is much overlap between these principles and the evaluation criteria listed above. We would use these as more of a final check and rely on the above criteria for the detailed analysis.

III. Specific Strategies for Waste Stabilization in Landfills (from table)

We used the 4/7/04 version of technology table as a starting list of strategies that the group would evaluate. We discussed them enough to make sure the list was reasonably complete and that the strategies were defined enough for further evaluation.

We then divided up the strategies and assigned 2 group members to flesh out each one. The assignees for each strategy can work together or independently. Goal is to have minimum level of expertise in room next time to answer questions and evaluate strategies.

Aerobic Bioreactor Landfill: air is pumped through lines in the waste to keep waste mass aerobic and take advantage of the speed of aerobic decomposition. Landfill can be allowed to go anaerobic once methane producing potential is gone.

Anaerobic Bioreactor Landfill: liquid additions (active or passive) to optimize anaerobic decomposition.

Hybrid Aerobic/Anaerobic Landfill: Cells or lifts operated aerobically at first, then allowed to go anaerobic, to get waste past acid-producing phase and improve anaerobic operation.

Controlled Natural Attenuation: Design allows release of contaminants into environment under controlled conditions and avoids development of dormant potential to produce uncontrolled pollution.

Pre-Landfill Aerobic Reaction: Digestion (composting) in vessels or piles, as batch or continuous operation, prior to landfilling of residuals.

Pre-Landfill Anaerobic Reaction: In-vessel anaerobic digestion prior to landfilling of residuals.

Catalytic Cracking: Waste plastics are shredded, mixed with catalyst and converted to liquid or gaseous fuels.

Enzymatic Hydrolysis: Enzymes used to convert carbohydrates into sugars that can be fermented into ethanol and useful byproducts.

Acid Hydrolysis: Acid (dilute or concentrated) used to convert carbohydrates into sugars that can be fermented into ethanol and useful byproducts.

Pre-Landfill Incineration: Recognizes that residuals go to landfill. Includes RDF (waste is shredded and non-burnables removed) and mass burn (shredded, no separation). If separation is carried out during collection, this is "Diversion of Wood/Paper for Energy Recovery," below.

Plasma-Arc Vitrification: e.g., Startech.

CWT Thermal Conversion: Changing World Technologies pyrolysis on selected organic wastes.

Pyrolysis/Gasification: Burning in oxygen-deficient conditions to produce syngas (gasification) or liquid fuels (pyrolysis).

Pre-Landfill Waste Shredding: Waste is shredded for volume reduction and better degradation.

Landfill Structural Design Changes: e.g., intensive leachate recirculation; delay in capping or installation of permeable cap. Some crossover with bioreactor category.

Increased Diversion of Organics: Definition needed: does "organics" include plastics? Four subcategories, at least: yard waste; compostable paper; food waste; food plus paper including waste corrugated.

Diversion of Wood/Paper for Energy Recovery: Separation is accomplished during collection.

Upstream Waste Reduction: Group suggested focussing on waste components with clear link to stability. Thought this could be justified for plastic film and possibly consumer packaging to the extent this includes plastic film or paper.

Household Hazardous Waste Reduction: Linked to stability because of toxicity to decomposition organisms. Also, HHW may promote mercury emissions and increase the risk of organically stable residuals.

Increased Paper Recycling: Linked to stability because organic.

IV. Next Meeting

Due to scheduling conflicts with the August 26 date previously discussed, we would like to change the date of the next meeting. First choice is Thursday, August 19. Second choice would be Thursday, September 2. Gene will check with group members.

Purpose of next meeting will be to evaluate the strategies in terms of pros/cons and the criteria discussed above. We would also hope to touch on how strategies fit together. Ideally we would emerge with a list of viable strategies and combinations.

In a future meeting, we would attempt to draft standards that might be used for each strategy to determine compliance with the code requirement to develop and implement a stability plan.

[We also need to discuss putting our interim work products out on the website so they are publicly available.]